

Remarks

Claims 14-33 are pending in this application.

Before discussing the rejection over the prior art, Applicants deem it prudent to set forth what they consider to be their invention. As presently claimed, the invention is an aqueous dispersion comprising a mixture of at least two different copolymers (a) and (b), and an emulsifier in an aqueous medium.

Copolymer (a) is a copolymer comprising residues of esters of substituted or unsubstituted acrylic acid with branched or unbranched alkyl alcohols containing from 8 - 22 carbon atoms and residues of esters of substituted or unsubstituted acrylic acid with alkyl alcohols containing from 1 - 6 carbon atoms. Copolymer (b) comprises residues of esters of substituted or unsubstituted acrylic acid with a perfluorinated alcohol and esters of a substituted or unsubstituted acrylic acid with an alkyl alcohol containing from 1 - 6 carbon atoms. The aqueous dispersion also contains an emulsifier (c). The aqueous dispersion of the invention is a mixture of the two separate polymer dispersions (a) and (b). One of the polymer dispersions contains polymer-containing residues of an ester of substituted or unsubstituted acrylic acid with a perfluorinated alcohol and residues of a substituted or unsubstituted acrylic acid with a 1 - 6 carbon atom alcohol.

The second polymer (a) in the polymer mixture comprises residues of substituted or unsubstituted acrylic acid with a C₁₋₆ carbon atom alcohol and residues of a substituted or unsubstituted acrylic acid with a C₈₋₂₂ carbon atom alcohol. The two dispersions are formed independently, then mixed to form the composition of the present invention. The composition of the present invention is a mixture of two polymers which, due to their structure, do not crosslink to a significant extent. The polymers are formed separately in two separate dispersions and the dispersions of the two separate polymers are mixed to form the aqueous dispersion of the present

invention. The polymers do not react in the dispersion but merely form a mixture which is applied to the fiber or flat textile to provide a hydrophobic finish comprising the dried polymer dispersion. The weight ratio of copolymer (a) to copolymer (b) is 10:1 to 1:10 and preferably 5:1 to 1:3.

The aqueous polymer dispersion of the present invention is distinguished in that it contains a mixture of a copolymer (a) which contains residues of a C₈₋₂₂ ester of (meth)acrylic acid and residues of a monomer containing C₁₋₈ alkyl esters of (meth)acrylic acid. The dispersion of copolymer (a) is mixed with a dispersion of a copolymer (b) comprising residues of a (meth)acrylic acid ester of a fluorinated alcohol containing from four to twelve fluorinated carbon atoms and residues of a (meth)acrylic acid ester of a C₁₋₈ alcohol. The copolymers are present in the dispersion in a ratio of 10:1 to 1:10.

The copolymer (a) contains at least 50% by weight of residues of (meth)acrylate esters of C₈₋₂₂ alcohols (see claim 19). Preferably, the dispersion of the present invention contains a copolymer (b) which contains at least 50% by weight of residues of the (meth)acrylate esters of the perfluorinated alcohol containing from 4 - 12 perfluorinated carbon atoms.

Applicants submit that the mixture of the two particular copolymers provides superior performance in relation to hydrophobic properties of the fiber or textile treated with the composition of the invention.

Claims 14-26 and 29-33 stand rejected under 35 U.S.C. 103(a) over Johnson Jr. et al. (U.S. 3,256,230); and claims 27 and 28 stand rejected under 35 U.S.C. 103(a) as unpatentable over Johnson Jr. et al. in view of Maekawa et al. (EP 1146103). Applicants respectfully submit that Johnson Jr. et al., alone or in view of Maekawa, neither teaches nor suggests the present invention.

Johnson Jr. et al. is directed to polymeric water and oil repellents. The polymeric water and oil repellents are applied to the fiber or textile fabric in a form of a dispersion

or a solution. The polymeric water and oil repellent composition can comprise a mixture of (meth)acrylate perfluoro alkyl polymers in admixture with copolymers of various ethylenically unsaturated monomers. Copolymers of the (meth)acrylic acid perfluorinated alkyl alcohol with other ethylenically unsaturated monomers are shown in Table III to be ineffective as oil and water repellent-treating compositions. At col. 10, lines 12-15, Johnson Jr. et al. teaches:

"The marked superiority of the polymer mixtures over the copolymers is apparent from Table 3. The copolymers shown in Table III are not improved by dilution with another non-fluorinated polymer."

In contrast to the teaching of Johnson Jr. et al., Applicants have discovered a narrow group of copolymers of a (meth)acrylic acid ester of a perfluorinated alkyl alcohol when mixed with a certain small group of copolymers of a certain composition as claimed in the present application, provides excellent water repellency properties to the composition when applied to fibers. Applicants therefore respectfully submit that the present invention is unexpected in view of the teachings of Johnson Jr. et al.

Firstly, Johnson Jr. et al. teaches away from the present invention. In addition, Johnson Jr. et al. neither teaches nor suggests the particular mixture of copolymers which Applicants have found to be effective hydrophobicizing compositions for fibers and textile materials. Since Johnson Jr. et al. teaches away from the present invention and neither teaches nor suggests the particularly narrow range of copolymers useful in the practice of the present invention, Applicants respectfully submit that Johnson Jr. et al. neither teaches nor suggests the present invention and a rejection based thereon is untenable.

In view of the negative teachings of Johnson Jr. et al. and the failure to teach or suggest the narrow range of copolymers useful in the practice of the present invention, Applicants submit that the deficiencies are not cured by combination with Maekawa et al. Maekawa et al. discloses a particular group of copolymers which are prepared by a

particular process requiring a high-pressure homogenation of the monomer mixture in a mixture of a high viscosity water-soluble organic solvent and water.

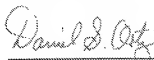
Maekawa is completely silent concerning a mixture of the copolymer with a non-fluorine-containing copolymer and the effects of the additional copolymer on the oil repellent and water repellent properties of a textile coated with the composition. Applicants therefore respectfully submit that Maekawa bears no relation to the invention claimed in claims 27 and 28 except for the addition of the alkylene glycols added as a solvent to the aqueous polymerization medium.

Applicants respectfully submit that Johnson Jr. et al. teaches away from the present invention, neither teaches nor suggests the particular narrow group of copolymers which are useful in the practice of the present invention and therefore would neither teach nor suggest to one skilled in the art the invention as presently claimed.

In addition, as discussed above, Maekawa does not cure the deficiencies in Johnson Jr. et al. and therefore claims 27 and 28 are patentable.

In view of the above discussion, Applicants respectfully submit that the application is in condition for allowance and favorable consideration is requested.

Respectfully submitted,



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